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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/501,114	02/10/2000	Yonhua Tzeng	A029 1080	3416

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EXAMINER	
MARKHAM, WESLEY D	
ART UNIT	PAPER NUMBER
1762	18

DATE MAILED: 03/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action	Application No.	Applicant(s)	
	09/501,114	TZENG, YONHUA	
	Examiner	Art Unit	
	Wesley D Markham	1762	

--The MAILING DATE of this communication appears on th cover sheet with the correspondence address --

THE REPLY FILED 04 March 2003 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

PERIOD FOR REPLY [check either a) or b)]

a) ☐ The period for reply expires _____months from the mailing date of the final rejection.

b) ☒ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1. ☐ A Notice of Appeal was filed on _____. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.

2. ☐ The proposed amendment(s) will not be entered because:

   (a) ☐ they raise new issues that would require further consideration and/or search (see NOTE below);

   (b) ☐ they raise the issue of new matter (see Note below);

   (c) ☐ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or

   (d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: _____.

3. ☒ Applicant's reply has overcome the following rejection(s): *See Continuation Sheet*.

4. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

5. ☐ The a)☐ affidavit, b)☐ exhibit, or c)☐ request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.

6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.

7. ☒ For purposes of Appeal, the proposed amendment(s) a)☐ will not be entered or b)☒ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

   The status of the claim(s) is (or will be) as follows:

   Claim(s) allowed: _____.

   Claim(s) objected to: _____.

   Claim(s) rejected: *1,3,5-19 and 21-28*.

   Claim(s) withdrawn from consideration: _____.

8. ☐ The proposed drawing correction filed on _____ is a)☐ approved or b)☐ disapproved by the Examiner.

9. ☐ Note the attached Information Disclosure Statement(s)(PTO-1449) Paper No(s). _____.

10. ☒ Other: *see attached Office Action*

WDM

Continuation of 3. Applicant's reply has overcome the following rejection(s): The 35 U.S.C. 112, second paragraph, rejections of Claims 1, 3, 5-12, 19, and 26.

SHRIVE P. BECK
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

DETAILED ACTION / ADVISORY ACTION

Response to Amendment

1. Acknowledgement is made of applicant's amendment D, filed as paper #17 on 3/4/2003 (with a certificate of mailing dated 2/24/2003), in which Claims 1 and 26 were amended, and Claim 20 was canceled. This amendment has been entered. As such, Claims 1, 3, 5 – 19, and 21 – 28 remain pending in U.S. Application Serial No. 09/501,114. In addition and in light of applicant's amendment D, the 35 U.S.C. 112, second paragraph, rejections of Claims 1, 3, 5 – 12, 19 and 26, set forth in paragraphs 5 – 7 of the previous Office Action (i.e., the final Office Action, paper #16, mailed on 12/24/2002), are withdrawn.

Response to Arguments

2. Applicant's arguments filed on 3/4/2003 have been fully considered but they are not persuasive.
3. First, the applicant states that SEL teaches the use of a magnetic field microwave plasma CVD system that operates at pressures of less than 1 Torr in order to produce diamond. The applicant then states that the applicant's invention, as claimed in Claims 1, 13, 21, and 25, is a method that uses a plasma CVD system to produce diamond. Next, the applicant states that methods of using a plasma CVD system and a magnetic field microwave plasma CVD system operate under different conditions and that the equipment required to produce the magnetic field used by SEL is expensive and complicated. As such, the applicant argues that SEL is non-

analogous art because one of ordinary skill in the art would not consult SEL, which discusses magnetic field microwave plasma CVD, and apply its teachings to the problem the applicant has solved by using a non-magnetic field plasma CVD system.

4. In response, the examiner strongly disagrees. First, the examiner notes that, although the preferred embodiment of SEL is clearly to produce diamond using a magnetic field microwave plasma CVD system, SEL also teaches that diamond can be produced according to their invention by a microwave plasma CVD system that does not include a magnetic field ("example 3", paragraphs [0019] – [0022]). This system has the advantage that the equipment is very simple and cheap (paragraph [0019]). In this respect, SEL is clearly analogous art. Second and importantly, the applicant's claims do not exclude using a magnetic field in conjunction with the microwave plasma CVD system. Nowhere in the applicant's claims is it indicated that the plasma CVD system / method operates without a magnetic field. As such, the applicant's characterization of the claimed process as utilizing a "non-magnetic field plasma CVD system" is inaccurate. Please note that it has been held that a prior art reference must either be (1) in the field of applicant's endeavor or, if not, then (2) be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, both the applicant and SEL are drawn to the deposition of diamond on a substrate by using a plasma CVD process, specifically a microwave plasma CVD

process, that includes methanol as a precursor and functions without the use of a carrier gas, specifically H_2. SEL even teaches a deposition pressure in the range claimed by the applicant (see applicant's Claims 6 and 18 and the abstract, example 1, and example 3 of SEL). Therefore, SEL is certainly in the field of the applicant's endeavor. In addition, SEL teaches that, since their process operates without hydrogen as a carrier gas, the process is safe (Abstract). The applicant is also concerned with the safety of the process, stating that the process of the presently claimed invention is safer than prior art processes because it eliminates the need for hydrogen (page 8, first full paragraph, of the response filed as paper #15 on 10/21/2002). As such, SEL is also reasonably pertinent to a particular problem with which the applicant was concerned (i.e., eliminating hydrogen as a carrier gas in order to improve the safety of the diamond deposition process).

5. Second, the applicant argues that Pryor is non-analogous art because Pryor teaches the use of a carrier gas (i.e., hydrogen) while the applicant's claimed process does not use a carrier gas such as hydrogen. In response to applicant's argument that Pryor is non-analogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Pryor is in the field of the applicant's endeavor. Specifically, both Pryor and the applicant's claims are drawn to the deposition of diamond on a substrate by using a microwave plasma CVD

process with mixed methanol precursors (see Col.9 of Pryor). Pryor even teaches deposition pressures in the range claimed by the applicant (Col.9, lines 44 – 47 of Pryor and applicant's Claims 6 and 18). Simply because Pryor uses hydrogen in the CVD process and the applicant does not does not render Pryor "non-analogous art".

6. Third, the applicant argues that one of ordinary skill in the art would not consider SEL and Pryor analogous art with each other, and thus the references would not be properly combinable. Specifically, the applicant argues that (1) SEL utilizes a magnetic field microwave plasma CVD system without a carrier gas such as hydrogen to deposit diamond while (2) Pryor utilizes a non-magnetic field microwave plasma CVD system with a carrier gas such as hydrogen to deposit diamond. In response, please note that, although the preferred embodiment of SEL is clearly to produce diamond using a magnetic field microwave plasma CVD system, SEL also teaches that diamond can be produced according to their invention by a microwave plasma CVD system that does not include a magnetic field ("example 3", paragraphs [0019] – [0022]). This system has the advantage that the equipment is very simple and cheap (paragraph [0019]). Therefore, both SEL and Pryor contemplate using a non-magnetic field microwave plasma CVD system to deposit diamond on a substrate. Regardless of the aforementioned teaching of SEL, both SEL and Pryor are drawn to the deposition of diamond on a substrate by using a microwave plasma CVD process and similar alcohol-containing precursors. Therefore, both references are in the same field of endeavor.

7. Fourth, the applicant argues that there is no motivation to combine SEL with Pryor, and doing so would render the method of SEL inoperative because SEL utilizes a magnetic field microwave plasma CVD system without a carrier gas such as hydrogen to deposit diamond while Pryor utilizes a non-magnetic field microwave plasma CVD system with a carrier gas such as hydrogen to deposit diamond.

8. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, SEL teaches liquid precursors such as methanol and ethanol (Abstract and paragraph [0011]) and that the diamond can be deposited "with 100% of alcohols" (paragraph [0010]), but does not explicitly teach using a combination of methanol and another compound having a carbon to oxygen ratio greater than one as the liquid precursor. Pryor teaches that, in the art of depositing diamond films by a microwave plasma CVD process (i.e., a process analogous to that of SEL), carbon-containing precursors such as methanol or ethanol can be utilized, as well as mixtures thereof (Col.9, lines 3 – 20). In other words, Pryor teaches the functional equivalence of individual methanol and ethanol precursors (e.g., as suggested by SEL) and combined methanol / ethanol precursors for depositing diamond in a

plasma enhanced CVD process. Therefore, it would have been obvious to one of ordinary skill in the art to utilize a mixed methanol / ethanol liquid precursor mixture in the process of SEL with the reasonable expectation of success and obtaining similar results (i.e., successfully depositing a diamond film on a substrate by using liquid alcohol-based precursors without a carrier gas, specifically hydrogen, as desired by SEL) when compared to utilizing either methanol or ethanol precursors individually. In other words, the prior art suggests that (1) either methanol or ethanol can be utilized to deposit diamond in a plasma CVD process (SEL) and that (2) a mixture of methanol and ethanol can be utilized to deposit diamond in plasma CVD process as opposed to methanol or ethanol alone (Pryor). This is clearly a suggestion in the prior art that methanol and ethanol, alone or in combination, should be utilized in a plasma CVD process to deposit diamond. One of ordinary skill in the art would have been motivated to combine SEL and Pryor in the manner done so by the examiner in order to obtain similar results (i.e., regardless of whether methanol and ethanol were used alone or in combination as precursors in a plasma CVD diamond deposition process). In response to the applicant's argument that a combination of SEL and Pryor would render the process of SEL inoperative, the examiner disagrees. Please note that the examiner has not argued that it would have been obvious to one of ordinary skill in the art to incorporate hydrogen as a reactive / carrier gas into the process of SEL. This is clearly not necessary, as both the applicant and SEL show that diamond can be deposited by microwave plasma CVD without the use of hydrogen. As SEL teaches that methanol and ethanol can be

utilized as precursors in the diamond plasma CVD process of their invention, a combination of methanol and ethanol as a mixed precursor (as suggested by Pryor) would in no way be expected to render the process of SEL inoperative.

9. With regards to the applicant's proposal to amend independent Claims 1, 13, 21, and 25 to include a pressure limitation (i.e., in a pressure range from about 20 to 80 Torr), the examiner notes that such a limitation would require further searching and/or consideration. However, upon initial examination, the examiner notes that such a limitation should be sufficient to overcome the art of record, specifically SEL which appears to teach a pressure below 20 Torr. With regards to the applicant's proposal to amend independent Claims 1, 13, 21, and 25 to include a methanol weight percentage limitation (i.e., in the range of from about 50 weight percent to about 99.5 weight percent), the examiner notes that such a limitation would require further searching and/or consideration. However, upon initial examination, the examiner notes that such a limitation should be sufficient to overcome the prior art of record so long as a showing of criticality or unexpected results is provided for the aforementioned weight percentage limitation.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (703) 308-7557. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Wesley D Markham
Examiner
Art Unit 1762

WDM
March 10, 2003

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